

## CLAIMS

What is claimed is:

1. A support apparatus for a camera and strobe lights, comprising:
  - a mounting plate for holding the camera substantially normal to and at a fixed distance from the photograph area;
  - a set of legs attached to one or more portions of the apparatus providing support and positions for mounting; and
  - a set of strobe lights affixed to the legs at known positions relative to the focal plane of the camera and directed towards the photograph area to facilitate acquisition of multiple photographic images capable of use in one or image processing operations.
2. The apparatus of claim 1 wherein the image processing operations are selected from a set of image processing operations including polynomial texture mapping and shape from shading.
3. The apparatus of claim 1 wherein one or more legs of the set of legs are attached to and supporting the mounting plate and wherein other legs of the set legs are attached to the mounting plate and other areas of the apparatus to provide the strobe lights with different azimuthal mounting points around the mounting plate.
4. The apparatus of claim 1 wherein the mounting plate is configured to receive a camera mounted on the mounting plate top surface and looking down through an aperture in the mounting plate.
5. The apparatus of claim 1 wherein the mounting plate is configured to receive a camera mounted on the mounting plate bottom surface.
6. The apparatus of claim 1 wherein the mounting plate comprises an optically clear material and is configured to receive a camera mounted on the mounting plate top surface.
7. The apparatus of claim 1 wherein the mounting plate and set of legs comprises a tripod.

8. The apparatus of claim 1 wherein the legs are telescoping.
9. The apparatus of claim 1 wherein a screen is attached between each of the legs, shielding the photograph area from ambient light.
10. The apparatus of claim 1 wherein a screen rolls out from one leg and attaches to an adjacent leg, shielding the photograph area from ambient light.
11. The apparatus of claim 1 further comprising a sequence controller to control the camera and sequential firing of the set of strobe lights.
12. The apparatus of claim 1 wherein the set of strobe lights are affixed with swivel mounts that allow the strobe lights to be rotated around the axis of the legs to facilitate compaction of the apparatus.
13. The apparatus of claim 1 wherein the strobe lights are affixable along the axis of the leg at one or more points of fixation.
14. The apparatus of claim 13 wherein the points of fixation are made with detents.
15. The apparatus of claim 1 wherein the strobe lights are affixable along the axis of a bar wherein at least one point on the bar is attached to at least one leg.
16. A support apparatus for a camera and strobe lights, comprising:
  - a mounting plate for holding the camera normal to and at a fixed distance from the photograph area;
  - a set of legs attached to one or more portions of the apparatus providing support and positions for mounting; and
  - a mobile strobe light slidably coupled to each leg, capable of self-propelled linear motion along the axis of the leg and providing indication of its position along the leg to facilitate acquisition of multiple photographic images capable of use in one or image processing operations.

**17.** The apparatus of claim 16 wherein the image processing operations are selected from a set of image processing operations including polynomial texture mapping and shape from shading.

**18.** The apparatus of claim 16 wherein one or more legs are attached to and support the mounting plate and other legs are attached to the mounting plate and other areas of the azimuth points around the mounting plate for mounting.

**19.** The apparatus of claim 16 wherein the mounting plate and a set of legs comprises a tripod.

**20.** The apparatus of claim 16 wherein the legs are telescoping.

**21.** The apparatus of claim 16 wherein a screen is attached between each of the legs to shield the photograph area from ambient light.

**22.** The apparatus of claim 16 wherein a screen rolls out from one leg and attaches to an adjacent leg to shield the photograph area from ambient light.

**23.** The apparatus of claim 16 further comprising a sequence controller to control the camera, position of the strobe lights, and sequential firing of the strobe lights.

**24.** The apparatus of claim 16 wherein the strobe lights are removable from the legs to facilitate compaction of the apparatus.

**25.** The apparatus of claim 16 wherein the strobe light rotates in elevation automatically according to its position along the leg in order to shine its light directly on the center of the photograph area.

**26.** The apparatus of claim 16 wherein the strobe light position is sensed by reading position information on the leg.

**27.** The apparatus of claim 26 wherein the position information is selected from a set of positional encodings including: optical Gray code, optical bar code, and mechanical detents.

**28.** A method of acquiring a set of photographs, comprising:

supporting a camera substantially normal to the photograph area;  
positioning a set of strobe lights at predetermined positions along a set of legs; and  
controlling the sequential firing of the set of strobe lights and acquisition of the  
resultant photographic images to be used in one or more image processing  
operations.

**29.** The method of claim 28 wherein the image processing operations are selected  
from a set of image processing operations including polynomial texture mapping and shape  
from shading.

**30.** The method of claim 28 wherein one or more legs of the set of legs are attached to  
and support the mounting plate and wherein other legs of the set of legs are attached to the  
mounting plate and other areas of the apparatus to provide the strobe lights with different  
azimuthal points around the mounting plate.

**31.** The method of claim 28 wherein the strobe lights are repositioned and  
sequentially fired to obtain additional photographic images to be used in polynomial texture  
mapping.

**32.** A method of acquiring a set of photographs using a supported camera and  
movable strobe lights, comprising:

calculating a first strobe light position and second strobe light position along the axis  
of a leg supporting the strobe light;

moving at least one strobe light to the first strobe light position automatically;

controlling the firing of at least one strobe light in the first strobe light position and  
acquisition of the resultant photographic image to be used in polynomial texture  
mapping; and

moving automatically one strobe light from the first strobe light position to the second  
strobe light position.

**33.** The method of claim 32 wherein the first strobe light position and the second strobe light position are determined according to a photograph sequence parameter that specifies the number of photograph sequences to be obtained; and wherein a photograph sequence represents photographic images lit by strobe lights in a set of positions.

**34.** The method of claim 33 further comprising one or more intermediate strobe light positions between the first strobe light position and the second strobe light position.

**35.** The method of claim 34 wherein the positions between the first strobe light position and the second strobe light position are spaced along the axis of the leg to provide consistent linear angular displacements with respect to the photographic subject.

**36.** An apparatus for acquiring a set of photographs, comprising:

means for supporting a camera normal to the photograph area;

means for positioning strobe lights at predetermined positions along the legs attached to one or more portions of the apparatus; and

means for controlling the sequential firing of the positioned strobe lights and acquisition of the resultant photographic images to be used in one or more image processing operations.

**37.** An apparatus for acquiring a set of photographs using a supported camera and strobe lights that are movable along the apparatus, comprising:

means for calculating a first strobe light position and second strobe light position along the axis of a leg supporting at least one strobe light;

means for moving automatically at least one strobe light to the first strobe light position;

means for controlling the firing of at least one strobe light in the first strobe light position and acquisition of the resultant photographic images to be used in polynomial texture mapping; and

means for moving automatically at least one strobe light from the first strobe light position to the second strobe light position.